

SAFMS ROUTING AND REMARKS SHEET - For Internal use only & to be filed w/doc

MEMO FOR RECORD:

DATE	ACTION	INFO
DIRECTOR		
DEP DIR		
EXECUTIVE		
Maj. Van Meter		
CWO. De Haro		
ASST FOR PQMS		
ASST FOR ELEC		
ASST FOR INST		
ASST FOR PHOTO		
ASST FOR SYS ENG		
AFPMC		
Col Runyon		
Col Dorfman		
RETURN TO		
FILE		

*Pls read, Initial +
Circulate, return to Sgt Hester.*

Col Istvan *[Signature]*

Maj Howard

[Signature]

Maj James

[Signature] 9/14

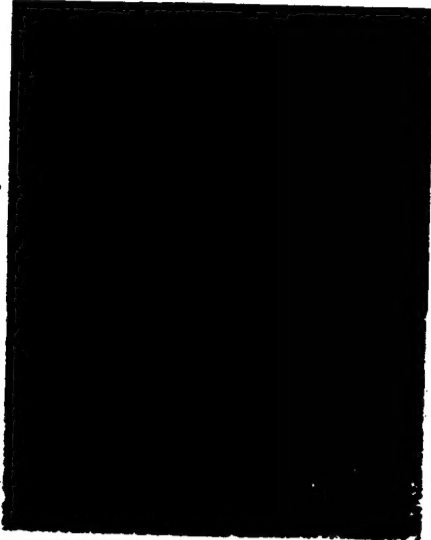
Maj Sides

Col. Horton

AL 60 0000 25834

"SAFUS Presentation to NSC"
25 August 1960

~~SECRET~~



SAMOS

NATIONAL SATELLITE RECONNAISSANCE SYSTEM

PHOTOGRAPHIC
ELECTRONIC

REQMTS PROVIDED BY:

UNITED STATES INTELLIGENCE BOARD
--SATELLITE INTELLIGENCE REQMTS COMMITTEE

DEVELOPMENT AGENCY,
UNITED STATES AIR FORCE

~~SECRET~~

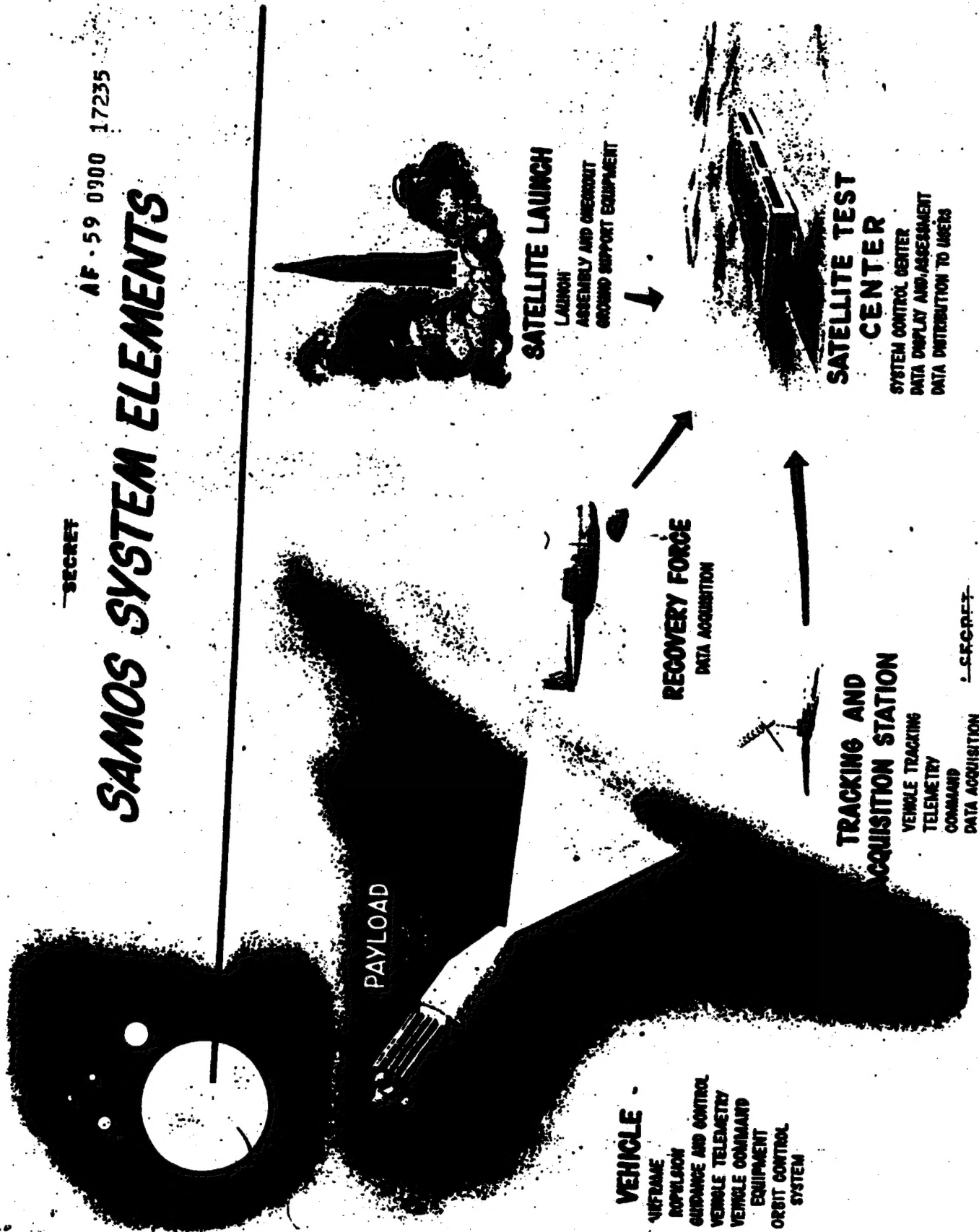
604018

#105

~~SECRET~~

AF 59 0900 17235

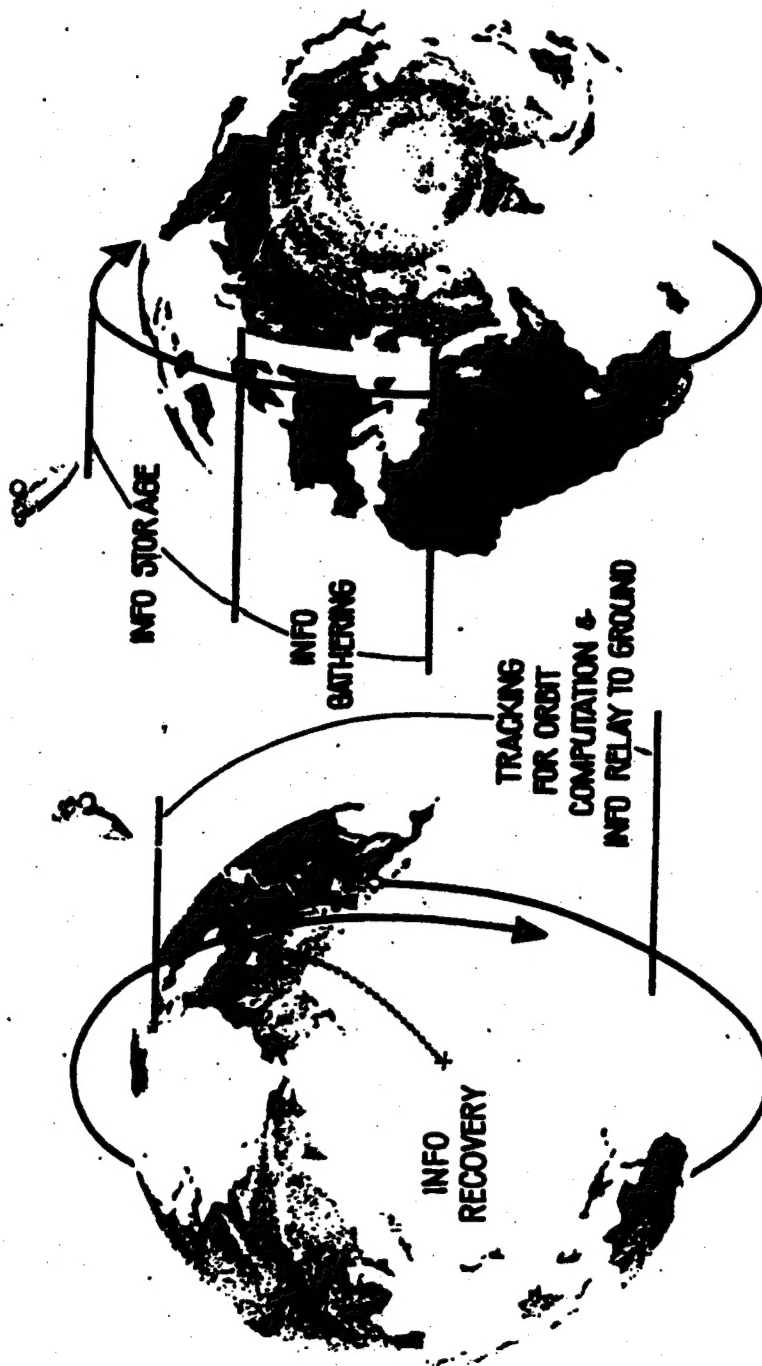
SAMOS SYSTEM ELEMENTS



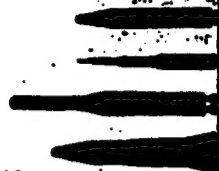
~~SECRET~~

SAMOS CONCEPT

150-300 S. MI. ALTITUDE - PHOTO & ELECTRONIC



~~SECRET~~

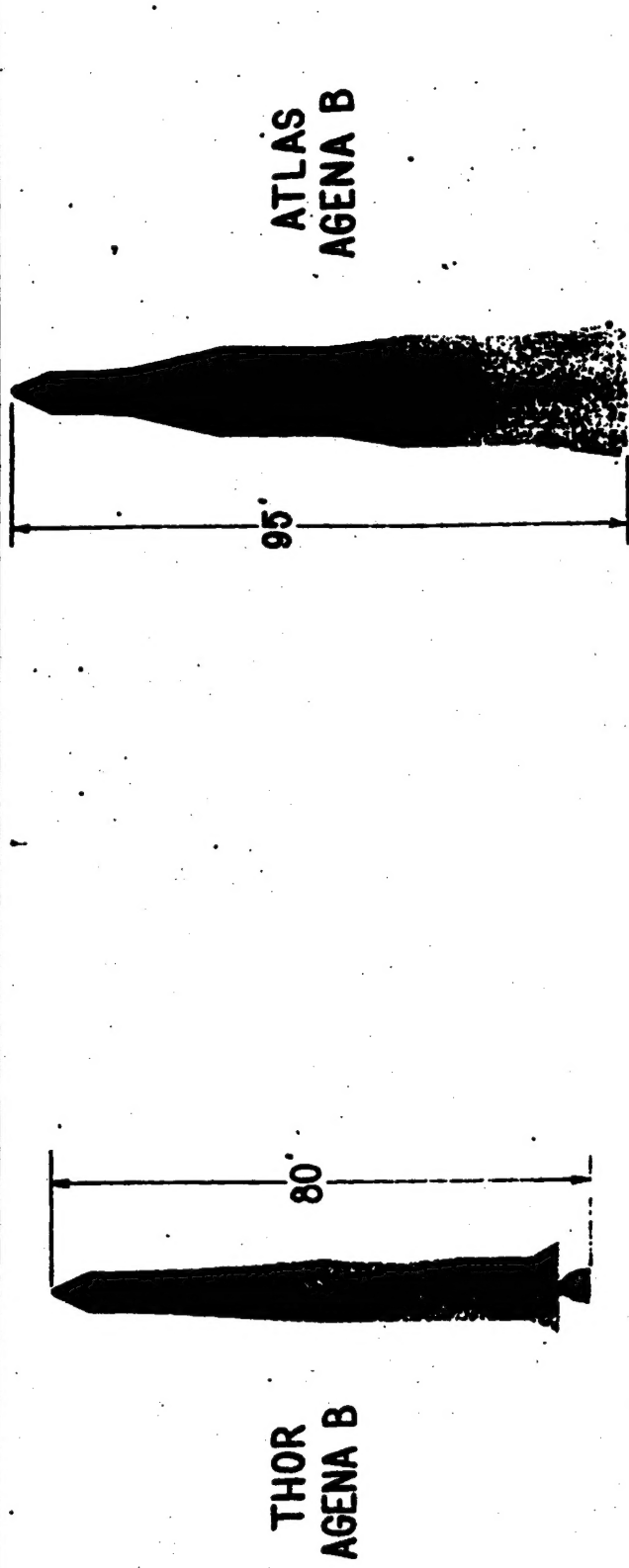


[Handwritten signature]

AI 60 0000 25798

~~CONFIDENTIAL~~

TYPICAL SIZE AND WEIGHT



AGENA B	EMPTY WEIGHT LAUNCH WEIGHT	1,400 16,150	AGENA B	EMPTY WEIGHT LAUNCH WEIGHT	1,400 19,800
THOR	EMPTY WEIGHT LAUNCH WEIGHT	8,830 107,170	ATLAS	EMPTY WEIGHT LAUNCH WEIGHT	14,150 258,130
TOTAL BOOSTER AND AGENA WEIGHT AT LAUNCH		123,320 LBS	TOTAL BOOSTER AND AGENA WEIGHT AT LAUNCH		277,930 LBS

~~CONFIDENTIAL~~

~~SECRET~~

SAMOS

- A SATELLITE RECONNAISSANCE SYSTEM IS COMPLEX WITH MANY ADVANCED DEVELOPMENTS REQUIRED, BUT IT CAN BE MADE TO WORK

- DEVELOPMENT PROGRESSION REQUIRED DUE TO PRESENT STATE-OF-THE-ART LIMITATIONS:

PHOTOGRAPHIC: 20' GROUND RESOLUTION 3' OR LESS

ELECTROMAGNETIC: SIMPLE DIGITAL COMPLEX DIGITAL & ANALOG

ACTIVE LIFE: 1 WEEK 4 MONTHS 1 YEAR

- THE DEVELOPMENT PROGRAM WILL INCLUDE FAILURES IN THE COURSE OF THE DEVELOPMENT EFFORT

~~SECRET~~

INTELLIGENCE REQUIREMENTS FOR SAMOS

PRIORITY I

1. Location of Operational ICBM Sites

PRIORITY II

- A. Descriptive Information on High Priority Target List Items
- B. Anti-Ballistic Missile Radars, Missile Telemetry, Earth to Satellite Transmissions

PRIORITY III

- A. Technical Characteristics of High Priority List Items
- B. Other Radars such as Early Warning, AAA, GCI, Shoran, SAM

PRIORITY IV

To the extent development proves feasible

~~SECRET~~

~~SECRET~~

OUTLINE REQUIREMENTS USIB - 6 JULY '60

PHOTOGRAPHIC

"GENERAL SEARCH" - 20' "RECOGNIZABILITY"

- 1ST PRIORITY - TO LOCATE SUSPECTED ICBM LAUNCH SITES BETWEEN NOW & END OF 1962
REPETITIVE SEARCH - ONCE EACH MONTH INITIALLY

"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

- 2ND PRIORITY - COVERAGE OF HIGHEST PRIORITY TARGET CATEGORY & SUSPICIOUS LOCATION
LAUNCH & CONTROL OF THESE - MISSION ON SHORT NOTICE

"TECHNICAL CHARACTERISTICS" - BETTER THAN 5' "RECOGNIZABILITY"

- 3RD PRIORITY - HIGH RESOLUTION COVERAGE TO DETERMINE TECHNICAL CHARACTERISTICS OF HIGHEST PRIORITY TARGETS BY THE END OF 1962

E-2 (LIMITED SEARCH CAPABILITY)
1ST FLT - APR '61
E-6
1ST FLT - JAN '62

E-5
1ST FLT - SEPT '61



~~SECRET~~

OUTLINE REQUIREMENTS

USIB - 6 JULY '60

PHOTOGRAPHIC

"GENERAL SEARCH" - 20' "RECOGNIZABILITY"

- 1ST PRIORITY - TO LOCATE SUSPECTED ICBM LAUNCH SITES
BETWEEN NOW & END OF 1962
REPETITIVE SEARCH - ONCE EACH MONTH INITIALLY

"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

- 2ND PRIORITY - COVERAGE OF HIGHEST PRIORITY TARGET
CATEGORY & SUSPICIOUS LOCATION
LAUNCH & CONTROL OF THESE - MISSION
ON SHORT NOTICE

"TECHNICAL CHARACTERISTICS" - BETTER THAN 5' "RECOGNIZABILITY"

- 3RD PRIORITY - HIGH RESOLUTION COVERAGE TO DETERMINE
TECHNICAL CHARACTERISTICS OF HIGHEST
PRIORITY TARGETS BY THE END OF 1962

~~SECRET~~

~~SECRET~~

OUTLINE REQUIREMENTS

USIB · 6 JULY 60

ELINT / COMINT

LESS PRIORITY AND VALUE THAN PHOTOGRAPHIC
RECONNAISSANCE, BUT SHOULD BE CARRIED ON
WITH HIGHEST PRIORITY SHORT OF INTERFERING
WITH PHOTOGRAPHY

IN VIEW OF THE UNCERTAINTIES OF A FULLY DEVELOPED ELECTRONIC RECON-
NAISSANCE SYSTEM, THERE IS A RELUCTANCE TO SPECIFY DETAILED
REQUIREMENTS FOR THE SHORT TERM

MOST IMPORTANT IS THE SEARCH FOR EMISSIONS ASSOCIATED
WITH BALLISTIC MISSILE SYSTEMS

~~SECRET~~

EXAMPLE OF TARGET THAT MAY BE IDENTIFIED AT DIFFERENT GROUND RESOLUTION

CITIES, FORESTS, RAIL ALIGNMENT, INDUSTRIAL COMPLEXES, MAJOR MILITARY INSTALLATIONS, AND LARGE BODIES OF WATER.

COMPONENTS OF MILITARY INSTALLATIONS, AIRBASE RUNWAYS, SUBMARINE BASES, MAJOR SURFACE TO AIR MISSILE SITES, ATOMIC ENERGY INSTALLATIONS, BALLISTIC MISSILE SITES, SURFACED SUBMARINES, LARGE AIRCRAFT AND MISSILE LAUNCHING PADS, IDENTIFICATION OF MAJOR SOVIET NAVAL FORCES.

LARGE AIRCRAFT AND KNOWN MISSILE CARRYING SUBMARINES, LOCATING SPECIAL WEAPONS, ABOVE GROUND ICBM AND IRBM FACILITIES, CAPACITY OF MILITARY STORAGE FACILITIES, IDENTIFICATION OF NAVAL SHIPS BY TYPES.

DETAILED INFORMATION ON MOST MILITARY AND INDUSTRIAL INSTALLATIONS, ALL AIRCRAFT, GROUND FORCES EQUIPMENT AND DISPOSITION, LARGE MISSILES, AAA SITES, STRUCTURAL SHIPBOARD CONFIGURATIONS, LEVELS OF MILITARY ACTIVITY.

DETAILED TECHNICAL INFORMATION ON AIR, NAVAL AND GROUND FORCES EQUIPMENT AND INDUSTRIAL PRODUCTION PROCESSES.

AT&T



ORBITAL CAPABILITY

VEHICLE

THOR & AGENA B
ATLAS & AGENA B

SYSTEM

E-5
E-1 / F-1
F-2
F-3
E-2

WEIGHT ON ORBIT
AT 150 N. MILES ALTITUDE: 2800 LBS
AT 261 N. MILES ALTITUDE: 2600 LBS
6500 LBS
6200 LBS

WEIGHT ON ORBIT
AT 150 N. MILES ALTITUDE: 5700 LBS
AT 261 N. MILES ALTITUDE:

4300 LBS
4100 LBS
4400 LBS
4900 LBS

E-5 WEIGHT DISTRIBUTION

AGENA EMPTY WEIGHT
(1400 LBS)

ON ORBIT POWER
SUPPLY SYSTEM

ATTITUDE CONTROL
AND SYSTEM COMMAND

PAYLOAD AND RECOVERY SYSTEM
(CAMERA & FILM - APPROX. 1000 LBS)

RESTART
AND
RESIDUAL
PROPELLANTS

2
WEIGHT ON ORBIT - (IN THOUSANDS OF LBS)

5

6

~~SECRET~~

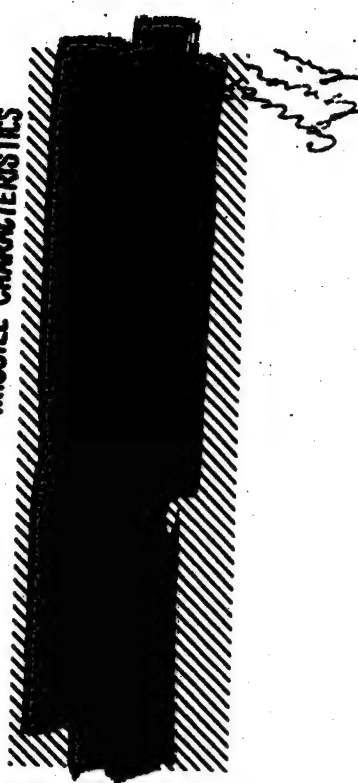
CHARACTERISTICS PHOTO PAYLOAD SYSTEMS

SYSTEM	DATA RETRIEVAL METHOD	RESOLUTION	SWATH WIDTH	OPERATING LIFE	MAX DAILY COVERAGE MILLION SQ NMI	TOTAL COVERAGE MILLION SQ NMI
E-1	READOUT	100'	87 NMI	10 DAYS	.57 (1 STA)	5.7
E-2	READOUT	20'	14.5 NMI	4 MOS	.033 (2 STA)	4.0
E-5	RECOVERY	5'	53 NMI	15-30 DA	0.6	4.9
E-6	RECOVERY	8'	200 NMI	5 DA	3.0	14.0

~~SECRET~~

VISUAL SENSORS CAPABILITIES

E-1 COMPONENT TEST PAYLOAD	E-2	E-5	E-6	HIGH RESOLUTION ADVANCED SYSTEM
TERRAIN FEATURES & COMMUNICATION CENTERS	IDENTIFY FEATURES & COMPLEXES	LEVEL OF MILITARY ACTIVITY	IDENTIFY FEATURES & COMPLEXES	ARCHITECTURAL FEATURES TECHNICAL EMPLOYMENT
AIRFIELDS	LARGE AIRCRAFT	IDENTIFY AIRCRAFT	LARGE AIRCRAFT	TECHNICAL CHARACTERISTICS
HARBOR FACILITIES & SHIPPING	SUBS - PIERS - SUPPORTING FACILITIES	IDENTIFY TYPES & USES (e. SHIPBOARD MISSILE FACILITIES	SUBS - PIERS SUPPORTING FACILITIES	TECHNICAL CHARACTERISTICS
LOCATE INDUSTRIAL COMPLEXES	IDENTIFY INSTALLATIONS	IDENTIFY MATERIAL PRODUCTION	IDENTIFY INSTALLATIONS	IDENTIFY
SUSPECT CONSTRUCTION OF MISSILE SITES	LOCATE MISSILE SITES	IDENTIFY TYPE OF MISSILE SITE	LOCATE MISSILE SITES	IDENTIFY TECHNICAL MISSILE CHARACTERISTICS
FIRST FLIGHT - SEP 60 3 FLIGHTS STRIP CAMERA 6" FOCAL LENGTH	FIRST FLIGHT - APR. 61 3 FLIGHTS STRIP CAMERA 36" FOCAL LENGTH	FIRST FLIGHT - SEPT. 61 7 FLIGHTS PANORAMIC CAMERA 66" FOCAL LENGTH		



~~SECRET~~

FERRET SENSORS CAPABILITY

F-1

RECOGNITION OF CONVENTIONAL
GROUND, NAVAL & AIRBORNE
RADAR SIGNALS

LOCATION WITHIN 150 N.M.
CIRCLE

FREQUENCY COVERAGE OF S
AND X BAND

ONETIME COVERAGE OF 60%
-70% OF SOVIET BLOC

1ST FLIGHT SEPT. 60 - 3 FLTS.
(IN COMBINATION WITH E-1)

F-2

RECOGNITION OF KNOWN AND
SUSPECTED SIGNALS

IMPROVED LOCATION ACCURACY

FREQUENCY COVERAGE FROM
59 TO 18,000 MC/S

COVERAGE OF ENTIRE SOVIET
BLOC EVERY FIVE DAYS

1ST FLT. JUNE-61
2 FLTS.

F-3

"FINE" LOOKS AT SIGNALS
DISCOVERED BY GENERAL
COVERAGE SYSTEM

"LOOKS" AT GIVEN SIGNALS
FROM HORIZON-TO-HORIZON

FREQUENCY COVERAGE SAME
AS GENERAL COVERAGE SYSTEM

WIDE BAND WIDTH (6 MC/S)
RECORDING OF ALL SIGNALS

1ST FLIGHT WILL BE
SCHEDULED

~~SECRET~~

[Handwritten signature]

AL 60 0001 25.446

~~SECRET~~

SAMOS OUTPUTS

READOUT

PHOTO E-2 (20')	{	VAFB STA ONLY	- 25 MIN PER DAY
ELINT F-2 (DIGITAL)		VAFB & NEW BOSTON STA - 53 MIN PER DAY	
		PER MINUTE OF READOUT - 800 SQ MILES	90 FT
		OF 35 M PRIMARY RECORD = 12 - 9 1/2" X 18" PHOTOS	
		10,000 INTERCEPTS	

RECOVERY

PHOTO E-5 (5')	PER MISSION - 4.9 MILLION SQ N MI
E-6 (8')	PER MISSION - 90 MILLION SQ N MI

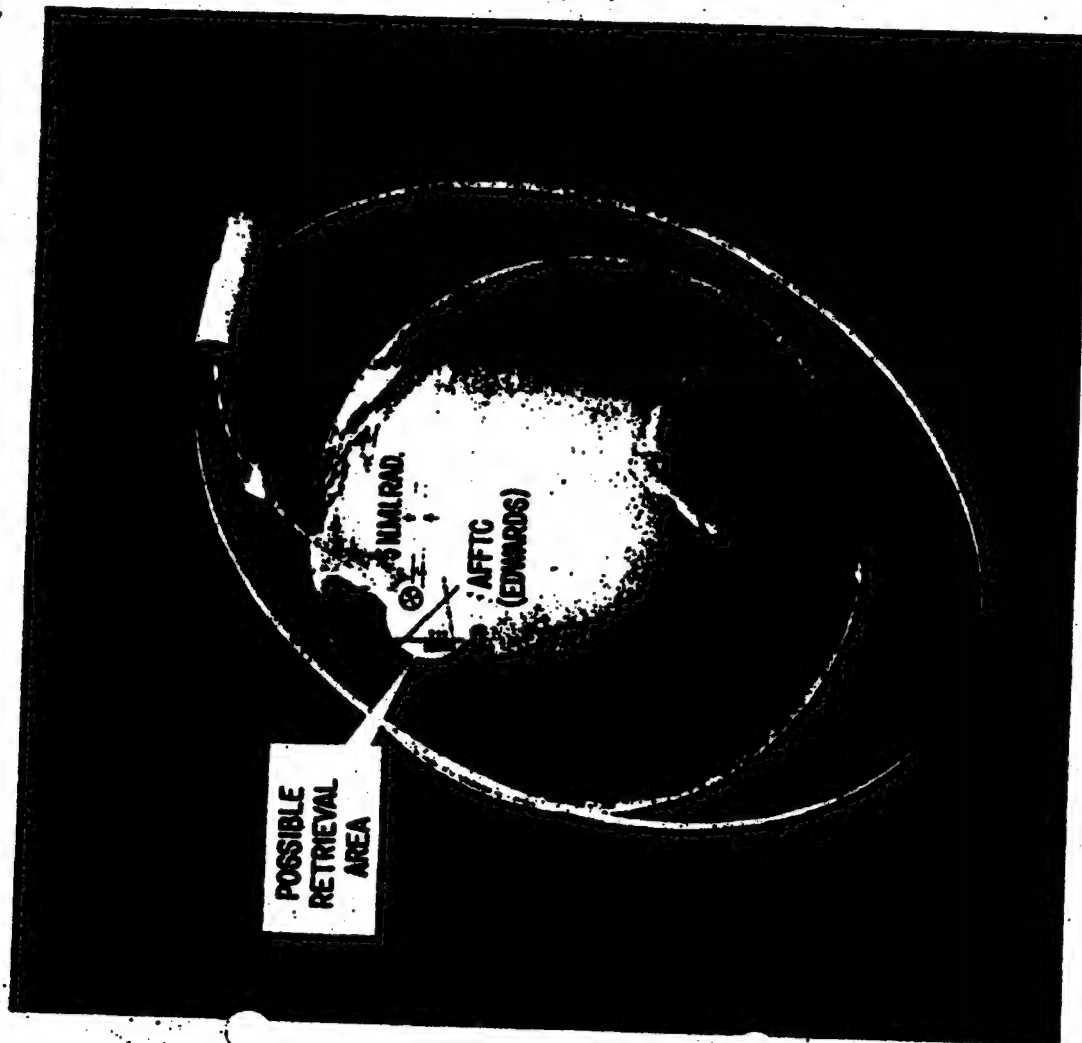
[Large blacked-out redacted area]

Recovery

~~SECRET~~

SAMOS E-6 — A NEW APPROACH

AL 60 0000 000003



RELIABILITY (SHORT LIFE)

LARGE AREA COVERAGE

HIGH RESOLUTION

EARLY CAPABILITY

PRECISE OVERLAND RETRIEVAL

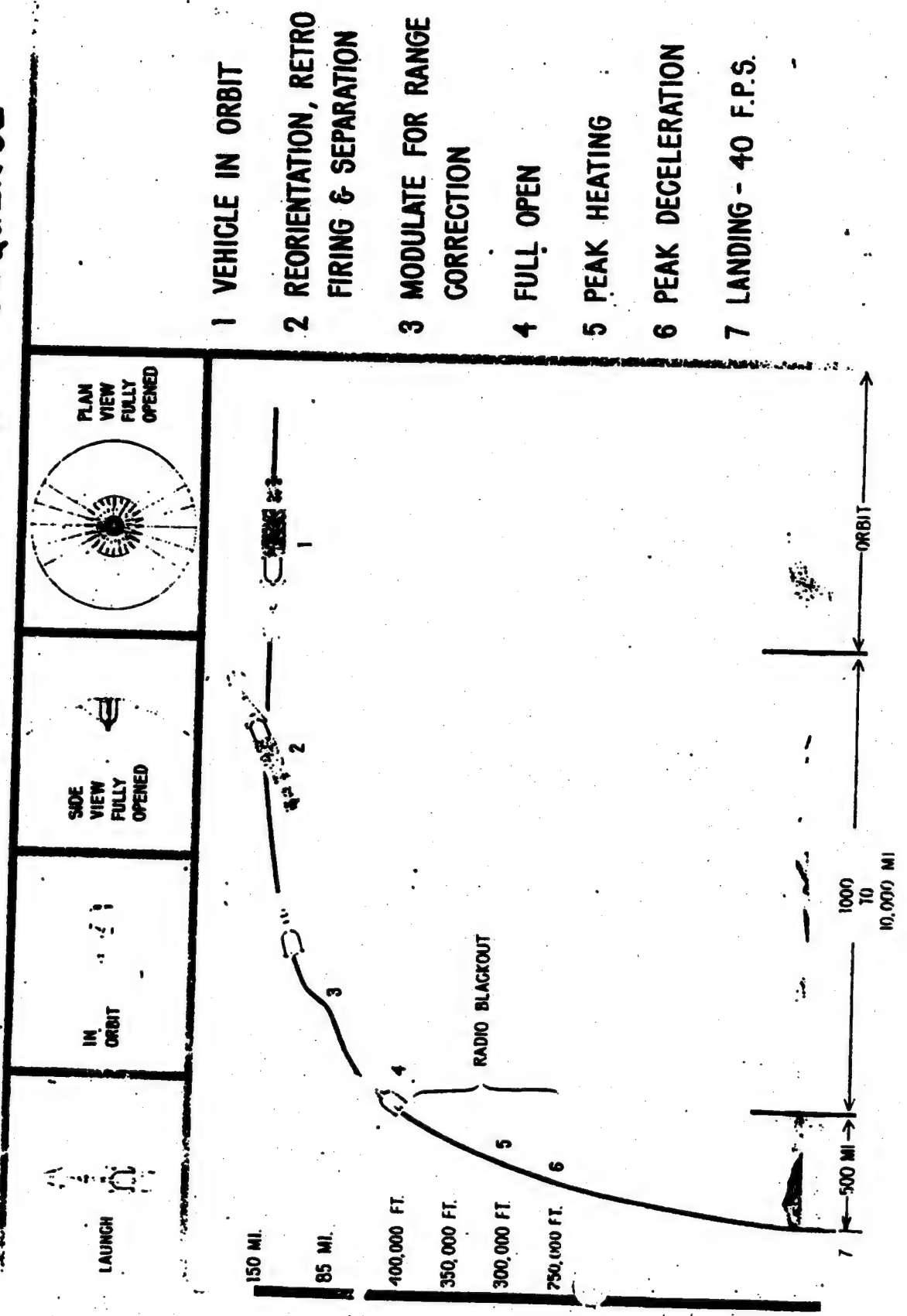
BROADENED CONTRACTOR BASE

COMPATIBLE WITH DATA

PROCESSING EQUIPMENT

**UTILIZE EXISTING GROUND
FACILITIES**

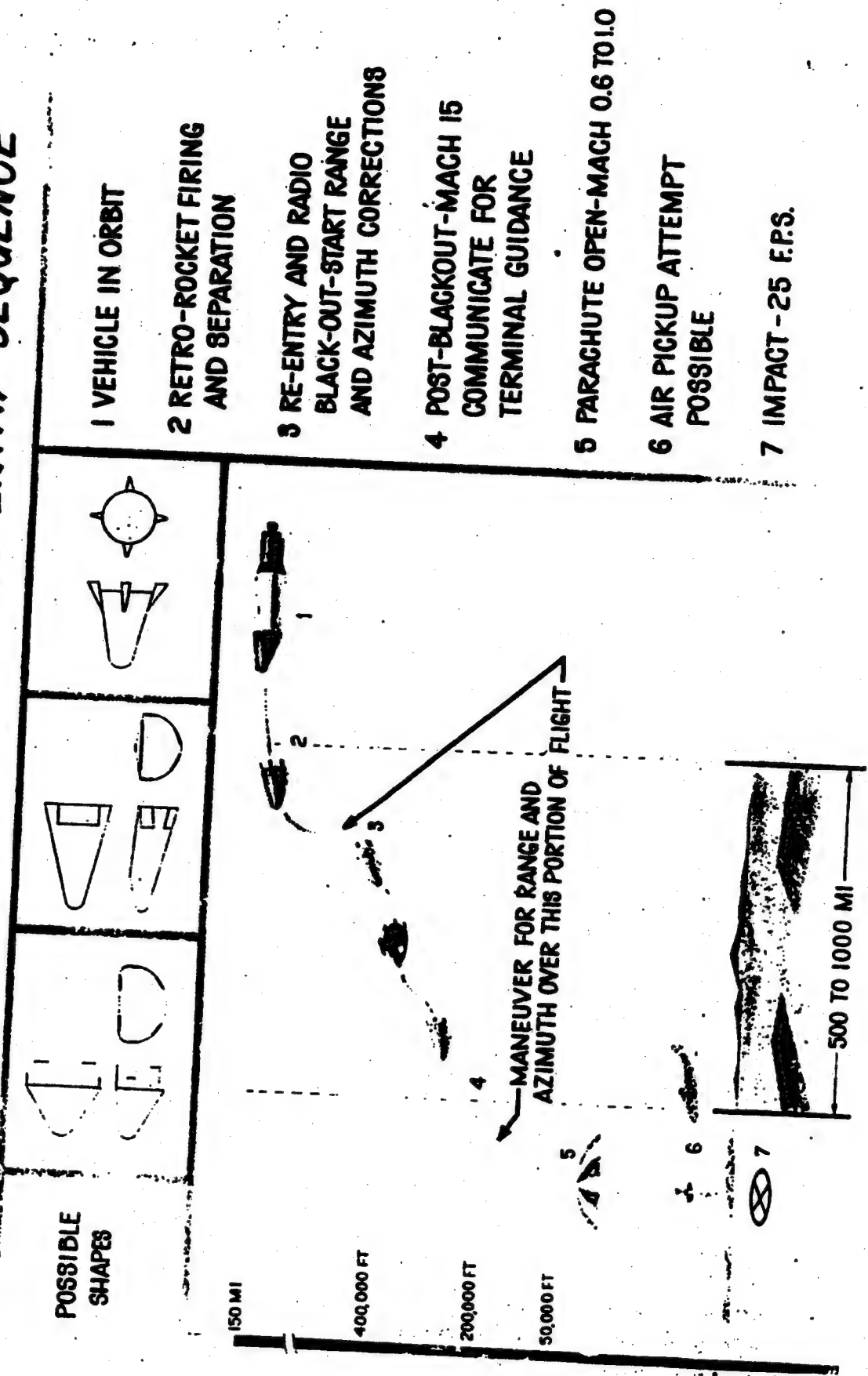
~~SECRET~~
SAMOS E-6 - DRAG BRAKE RE-ENTRY SEQUENCE
 11 60 0000 25HR1



SAMOS E-6 - TYPICAL LIFT RE-ENTRY SEQUENCE

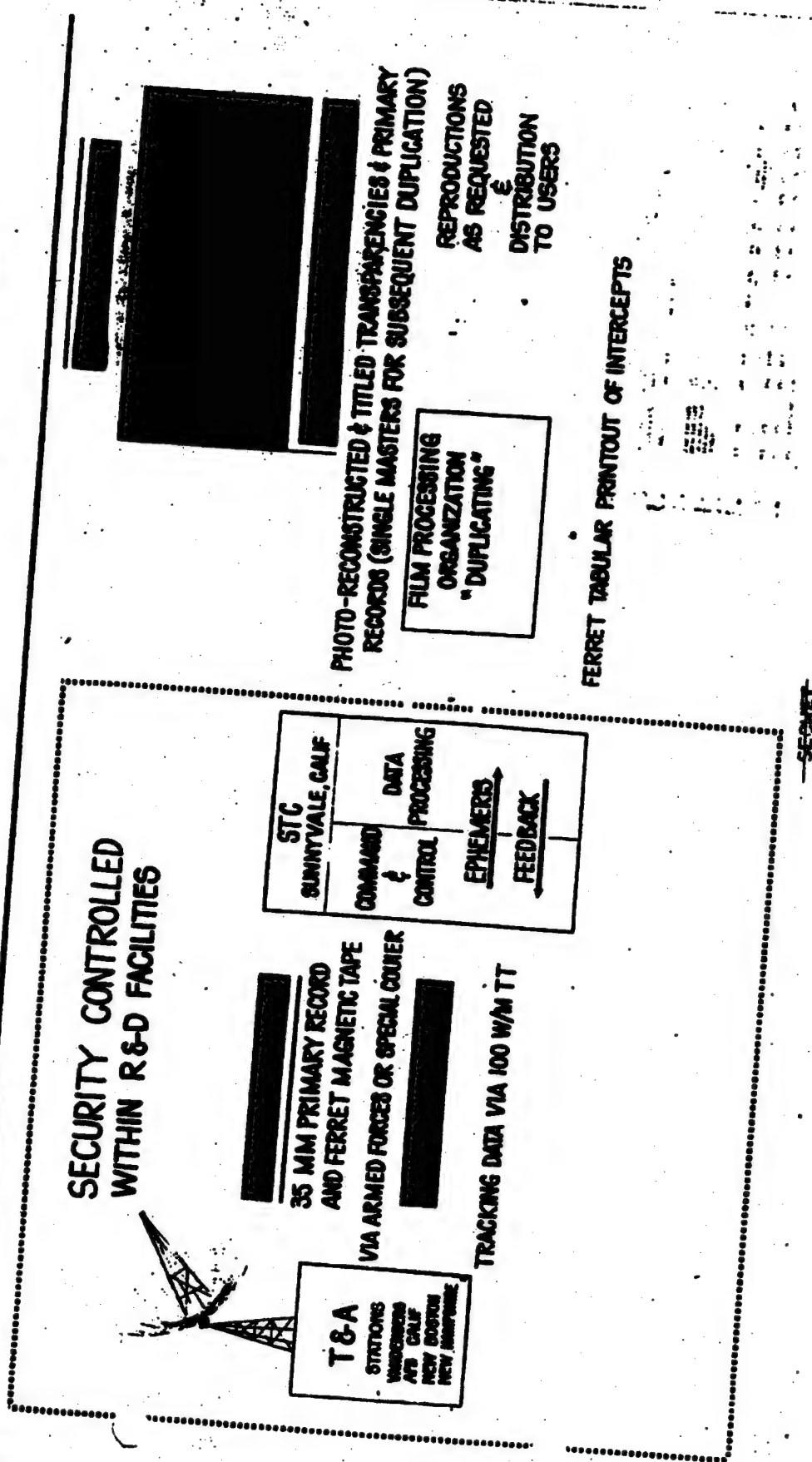
SECRET

AL GO UNCL 21882



LEADS

~~SECRET~~
INTERIM READOUT R & D DATA FLOW



~~SECRET~~

AL 60 0000 25862

SUMMARY

ELEMENTS OF SAMOS RESEARCH AND DEVELOPMENT PROGRAM

• RECOVERY

E-5 PHOTO 5' RESOLUTION --- 7
E-6 PHOTO 8' RESOLUTION --- 7
DIAGNOSTIC RECOVERY --- 7
• READOUT --- 4

COMPONENT TESTS

PHOTO-ELINT E-1/F-1-3
E-2 PHOTO 20' RESOLUTION --- 2
F-2 ELINT DIGITAL --- 1

• SPECIAL COMPONENT TESTS

- LAUNCHINGS FROM PT. ARGUELLO
- TRACKING STATIONS

24 PLUS 5 UNASSIGNED

ATLAS/AGENA(THRU 1962)

VANDENBERG AND NEW BOSTON, INCL. READOUT
HAWAII AND ALASKA VHF ONLY

- CONTROL - SATELLITE TEST CENTER - SUNNYVALE
- DATA PROCESSING

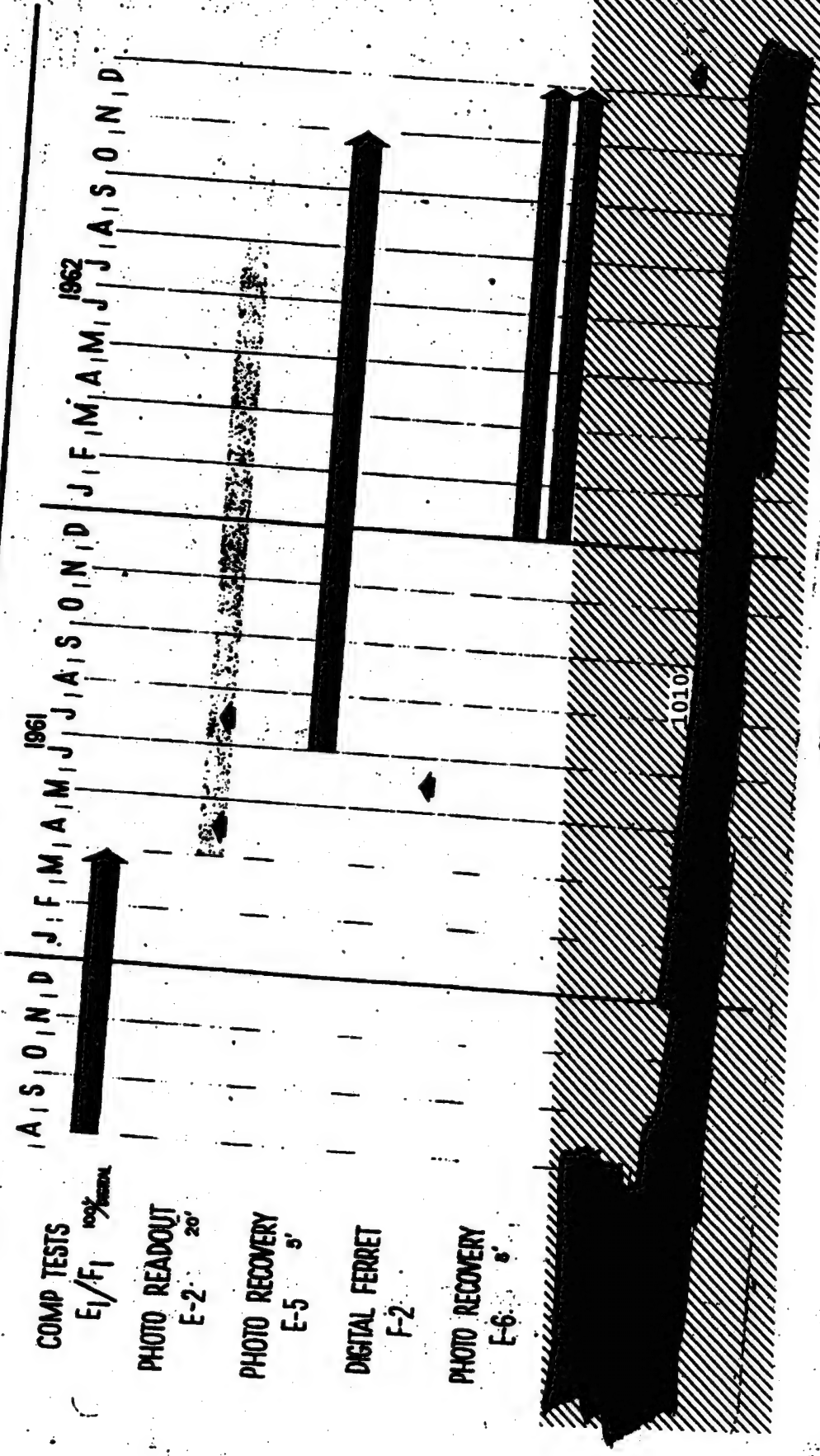
DEVELOPMENT LABORATORY - DENVER
INTERIM PROCESSING OF R&D TAKE - SUNNYVALE

- RECOVERY CENTER - HAWAII

~~SECRET~~

SAMOS LAUNCH SCHEDULE 11 AUG 60 DEV PLAN

AL GO 0000 2-94



SECRET

DIAGNOSTIC FLIGHTS

CONFIDENTIAL

SAMOS FUNDING STATUS *(IN MILLIONS)*

REALIGNMENT OF PRESENT PROGRAM.
TECHNICAL DIRECTION AND SYSTEM
INTEGRATION FOR PRESENT PROGRAM.
TOTAL PRESENT PROGRAM FOR FY 1961.
NEW RECOVERY PROGRAM.
ADDITIONAL BACK-UP TECHNICAL EFFORT.
ADDITIONAL BOOSTERS & AGENAS FOR
FLEXIBILITY.
AGENA GROUND SUPPORT EQUIPMENT FOR
NEW STANDS.
TOTAL ADDITIONAL PROGRAM

**TOTAL REVISED FY 61
SAMOS PROGRAM**

**FY 1961 FUNDING
REQUIREMENTS**



CONFIDENTIAL

BACKGROUND

IMPROVEMENT UNDERTAKEN BY U.S. AIR FORCE IN 1956
FEASIBLE ONLY WITH THE DEVELOPMENT OF LARGE BOOSTERS
RESULTING FROM BALLISTIC MISSILE PROGRAM
ORIGINALLY ORIENTED TOWARD A "READOUT" DATA RETRIEVAL
TECHNIQUE

- ELECTRONIC WIDE BAND LINK - VEHICLE TO GROUND
- PHYSICAL RECOVERY OF PACKAGE FROM ORBIT DID NOT
APPEAR TO BE WITHIN STATE OF THE ART

REORIENTED AUGUST 1960 TOWARD "RECOVERY" DATA RETRIEVAL
TECHNIQUE

PHYSICAL RECOVERY TECHNIQUES HAVE BECOME A FACT
AND OFFER A BETTER AND MORE ECONOMICAL
SOLUTION TO UNITED STATES INTELLIGENCE BOARD
INTELLIGENCE REQUIREMENTS

SECRET

OPERATIONAL SECURITY COUNCIL DIRECTIVE

1 SEPTEMBER 1960

REORIENT PROGRAM TO HIGHEST PRIORITY FOR RECOVERABLE, HIGH RESOLUTION, CONVERGENT STEREO PHOTOGRAPHY

LAND RECOVERY AS SOON AS POSSIBLE
COMPETENCE TO IDENTIFY WITH CERTAIN MISSILE SITES BOTH IN CONSTRUCTION AND AFTER COMPLETION

COMPETENCE TO STUDY STATE OF READINESS, TYPE OF ACTIVITY AND TYPE OF MISSILE

REDUCE ELECTRONIC READ-OUT EFFORT TO LOWER PRIORITY-SUBSTANTIALLY
CUT BACK GROUND-BASED ELECTRONIC READ-OUT SYSTEM

CONTINUE FERRET (ELECTRONIC) PROGRAM WITH PRIORITY LOWER
STEREO PHOTOGRAPHY

PROGRAM TO BE MANAGED WITH DIRECT LINE OF COMMAND-SECRETARY
DEFENSE TO SECRETARY OF THE AIR FORCE TO GENERAL OF THE AIR
OPERATIONAL CHANGE OF PROGRAM

REQUIREMENTS

UNITED STATES INTELLIGENCE BOARD
6 JULY 1960

PHOTOGRAPHIC

"GENERAL SEARCH" - 20' "RECOGNIZABILITY"

- 1ST PRIORITY - TO LOCATE SUSPECTED ICBM LAUNCH SITES BETWEEN NOW AND END OF 1962

"DESCRIPTIVE" INFORMATION - 5' "RECOGNIZABILITY"

- 2ND PRIORITY - COVERAGE OF HIGHEST PRIORITY TARGET CATEGORY AND SUSPICIOUS LOCATION LAUNCH AND CONTROL OF THESE - MISSION ON SHORT NOTICE

"TECHNICAL CHARACTERISTICS" - BETTER THAN 5' "RECOGNIZABILITY"

- 3RD PRIORITY - HIGH RESOLUTION COVERAGE TO DETERMINE TECHNICAL CHARACTERISTICS OF HIGHEST PRIORITY TARGETS BY END OF 1962

ELECTRONIC

LESS PRIORITY AND VALUE THAN PHOTOGRAPHIC RECONNAISSANCE BUT SHOULD BE CARRIED ON WITH HIGHEST PRIORITY SHORT OF INTERFERING WITH PHOTOGRAPHY

IMPORTANCE IS THE SEARCH FOR EMISSIONS OF SIGNALS IN INITIAL STAGES OF MISSILE SYSTEM